UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,486	10/17/2006	Alexander Poschalko	4804-5	2589

23117 7590 12/16/2009

NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER	
KAHN, RACHEL	
ART UNIT	PAPER NUMBER
1796	
MAIL DATE	DELIVERY MODE
12/16/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/593,486	POSCHALKO ET AL.	
	Examiner	Art Unit	
	RACHEL KAHN	1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-32 and 34-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-32 and 34-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 25-32 and 34-36 are pending as amended on 8/31/09

Election/Restrictions

Applicant's election without traverse of:

- UV absorbing chromophore V-E (p-aminobenzoic acid derivative) in claim 25
- Fomula II in claim 30

in the reply filed on 8/31/09 is acknowledged.

Response to Amendment

All objections (to minor informalities) and rejections set forth in the action dated 2/3/09 are withdrawn in view of Applicant's amendment cancelling claims 13-24. New claims 25-32 and 34-36 correspond to the cancelled claims rejected in the action dated 2/3/09. However, Applicant's amendment removing benzoic acid from the Markush group of chain terminating UV absorbers in the independent claim overcomes the previously set forth rejections. Although the newly set forth rejections herein were necessitated by Applicant's amendment, this action is made non-final in view of the restriction requirement (dated 7/31/09) made by Examiner after the response by Applicant to the non-final rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 25-31 and 35-36 are rejected under 35 U.S.C. 102(e) as being anticipated by **Vanmaele** et al (US 7507785).

Vanmaele et al (US 7507785) discloses a hyperbranched polymer prepared from a trimethylolpropane initiator and glycidol (PC-8; col 13) which is functionalized with a group meeting the structure of the UV chromophore "V-E" in instant claim 1 (col 16, "SYN-1"), See also Example 1, col 34-35.

.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 25-32 and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Keller** et al (US 6143850) in view of **Sunder** et al (US 6765082) and **Tournilhac** et al (US 6287552).

Keller discloses a cosmetic sunscreen comprised of polymer-bound benzoic acid chromophores for protecting the skin and hair from UV radiation. The UV absorbing groups are covalently linked to the polymer (col 1, lines 1-17). As the UV absorbing groups, Keller teaches that 5-95% of the units are p-aminobenzoate derivatives (col 1, line 50 to col 2, line 20; see formula I, unit "a;" see also Examples 1-3).

Keller teaches a linear polymeric backbone, and therefore fails to teach that the polymeric carrier for the UV absorbing groups is a hyperbranched polymer derived from glycidol (as required by the instant claims).

Sunder teaches a highly branched polyol based on glycidol which is narrowly distributed and has a defined structure. The degree of polymerization can be controlled via the monomer/initiator ratio (col 1, lines 1-47). The highly branched polymers are versatile highly functional polymer intermediates. The hydroxyl groups at the ends of each branch can be derivatized, and the degree of functionalization can be carefully controlled by controlling the degree of polymerization. Sunder teaches that the ability to functionalize the polymer opens up diverse possible applications, including polymer blends and as active ingredients in medicine and biochemistry (col 3, lines 53-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Sunder's hyperbranched glycidol-based polymer for the polymeric carrier used by Keller in order to functionalize the polymer with UV-

absorbing chromophores in an easily controlled manner. The obviousness of using a hyperbranched polymer such as the one taught by Sunder in the sunscreen taught by Keller is further evidenced by the teachings of Tournilhac.

Tournilhac teaches that in dermatological topical compositions (sunscreen specifically disclosed – col 10, line 4), polymers are often employed because they are capable of forming films when applied to the skin. The film forming polymers are generally of high molecular weight. Increasing the concentration of the polymer improves the film forming property, but causes an excessive increase in viscosity, causing the finished product to become too thick. In order to overcome this disadvantage, Tournilhac teaches using a dendritic (hyperbranched) polymer having terminal hydroxyl groups. These hyperbranched polymers are capable of film-forming while remaining only slightly viscous (col 1, lines 1-50). Tournilhac further teaches functionalizing some of the terminal hydroxyl groups of the polymer with a chain terminating agent chosen to modify the physicochemical properties of the polymer (col 4, lines 9-29).

It would have been further obvious, therefore, to one of ordinary skill in the art at the time the invention was made, to have used Sunder's hyperbranched polymer as the polymeric carrier taught by Keller, in order to improve the film forming properties of the sunscreen on the skin without causing an excessive increase in viscosity.

Regarding instant **claims 26, 27 and 29-31**, Sunder teaches an example using trimethylolpropane as the initiator with the glycidol building blocks (example 1, col 4). The molar mass is 3700, and the degree of branching is 26% (col 5, lines 10-15)

Regarding instant **claim 28**, Sunder is silent on the number of dendritic building blocks. However, given that the recitations regarding molecular weight and branching are met, the recitation of instant claim 28 is deemed inherently met.

Regarding instant **claim 32 and 34**, Sunder teaches that the highly branched polyols can be reacted with a second epoxide monomer (col 4, lines 15-60). These copolymers fulfill the structural formula for the hyperbranched polymer of claim 32. They further fulfill the recitations of instant claim 34 for the linker unit LX.

Regarding instant **claim 35**, Sunder teaches capping the hydroxyl groups through a number of reactions, e.g. alkylation or esterification (col 3, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to balance the number of number of UV absorbing groups and the number of capping groups based on the desired functionality and intended application of the polymer.

Claims 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Keller** et al (US 6143850) in view of **Sunder** et al (US 6765082; cited herein as '082) and **Tournilhac** et al (US 6287552) as applied to claim 29 above, and further in view of **Sunder** (in *Macromolecules*, **2000**, 33, pp 309-314; cited herein as "MM 00").

The discussion with regard to the rejection of **claims 25-32 and 34-36** under 35 U.S.C. 103(a) as being unpatentable over Keller et al (US 6143850) in view of Sunder

et al (US 6765082; cited herein as '082) and Tournilhac et al (US 6287552) is incorporated herein by reference.

While '082 teaches reacting the hyperbranched polyol with propylene oxide and ethylene oxide ('082, col 4, lines 15-20), and teaches esterifying and etherifying the hydroxyl groups (col 3, lines 65-67), '082 fails to teach 1 to 20 carbon atoms.

Sunder (in MM 00) teaches that adding short oligo(propylene oxide) segments to the hydroxyl end groups of hyperbranched polyols permits tailoring the polarity of the polymer without reducing the functionality or varying the structure. Sunder (MM 00) teaches that attaching the segments increases the solubility of the polymers in organic solvents, which is important given that most applications for the polymers involve further functionalizing of end groups (p 309, introduction). The solubility of the polymers can be tailored by variation of the block lengths between 1 and 5 (p 314, conclusion). It would be obvious, therefore, to one of ordinary skill, to attach a straight chain ether segment, as taught by Sunder (MM 00) to the hyperbranched polyol support molecule in order to achieve better solubility for the functionalization reaction with the UV absorbing groups taught by Keller. Regarding instant claim 35, it would be obvious to one of ordinary skill in the art to vary the number of capping groups within the claimed ranges in order to tailor the solubility of the polymer. Regarding instant claim 36, Sunder teaches up to five propylene oxide units (15 carbon atoms) per segment (MM 00 abstract).

Claims 25-31 and 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Sunder** (in *Macromolecules*, **2000**, 33, pp 309-314) in view of **Keller** et al (US 6143850) and **Tournilhac** et al (US 6287552).

Sunder discloses a hyperbranched polymer prepared by ring opening polymerization of glycidol followed by addition of propylene oxide (abstract, introduction). Sunder teaches that attaching short oligo-propyleneoxide segments to the hydroxyl end groups of the hyperbranched polyglycerol allows tailoring of the polarity, solubility and flexibility of the polymer (p 309, bottom left and top right columns).

The disclosed hyperbranched polymers are highly suited for functionalization because the propylene oxide segments improve solubility without sacrificing functional group density (p 309, left column). While Sunder clearly envisions functionalizing the polymers by derivatization of the hydroxyl end groups (p 314, conclusion), Sunder fails to teach specific functional groups.

Keller teaches polymer-bound benzoic acid chromophores for protecting the skin and hair from UV radiation (col 1, lines 1-7). Keller teaches that polymers are generally added to sunscreens to achieve the desired water resistance. Keller discloses linking the UV absorbing groups covalently to a polymer (col 1, lines 15-16) and teaches a polymeric UV absorber wherein 5-95% of the polymer units comprise an aminobenzoate moiety which meets the structure of formula "V-E" in instant claim 1 (col 1, line 50 to col 2, line 20; see formula I, unit "a;" see also Examples 1-3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have functionalized the hyperbranched polymer taught by Sunder with the UV absorbing aminobenzoate group taught by Keller in order to impart UV absorbing, skin protecting functionality to Sunder's polymers.

The obviousness of modifying the hyperbranched polymer taught by Sunder for use in a cosmetic composition, such as the sunscreen taught by Keller, is further evidenced by the teachings of Tournilhac.

Tournilhac teaches that in dermatological topical compositions (sunscreen specifically disclosed – col 10, line 4), polymers are often employed because they are capable of forming films when applied to the skin. Film forming polymers are generally of high molecular weight. Increasing the concentration of the polymer improves the film forming property, but causes an excessive increase in viscosity, causing the finished product to become too thick. In order to overcome this disadvantage, Tournilhac teaches using a dendritic (hyperbranched) polymer having terminal hydroxyl groups. These hyperbranched polymers are capable of film-forming while remaining only slightly viscous (col 1, lines 1-50). Tournilhac further teaches functionalizing some of the terminal hydroxyl groups of the polymer with a chain terminating agent chosen to modify the physicochemical properties of the polymer (col 4, lines 9-29).

It would have been further obvious, therefore, to one of ordinary skill in the art at the time the invention was made, to have functionalized Sunder's hyperbranched polymer with the UV absorbing groups taught by Keller, in view of Tournilhac's

disclosure showing that the sunscreen would have both good film forming as well as favorable viscosity characteristics.

Regarding instant **claims 26, 27 and 29-31**, Sunder teaches using trimethylolpropane as the initiator with the glycidol building blocks (p 310, fig 1). Sunder discloses four polyglycerols prepared having a degree of branching of 0.58 and molecular weights between 1800-4000 (p 311, left column, middle).

Regarding instant **claim 28**, Sunder is silent on the number of dendritic building blocks. However, given that the recitations regarding molecular weight and branching are met, the recitation of instant claim 28 is deemed inherently met.

Regarding instant **claims 34-36**, Sunder teaches that adding short oligo(propylene oxide) segments to the hydroxyl end groups of hyperbranched polyols permits tailoring the polarity of the polymer without reducing the functionality or varying the structure. Sunder teaches that attaching the segments increases the solubility of the polymers in organic solvents, which is important given that most applications for the polymers involve further functionalizing of end groups (p 309, introduction). The solubility of the polymers can be tailored by variation of the block lengths between 1 and 5 (p 314, conclusion). Regarding instant claim 35, it would be obvious to one of ordinary skill in the art to vary the number of capping groups within the claimed ranges in order to tailor the polarity and solubility of the polymer. Regarding instant claim 36, Sunder teaches up to five propylene oxide units (15 carbon atoms) per segment (abstract).

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Sunder** (in *Macromolecules*, **2000**, 33, pp 309-314; cited herein as "*Hyperbranched*") in view of **Keller** et al (US 6143850) and **Tournilhac** et al (US 6287552) as applied to claim 29 above, and further in view of **Sunder** et al (in Macromolecules, vol 33, No 21, 2000, pp 7682-7692; cited herein as "*Copolymers*").

The discussion with regard to the rejection of **claims 25-31 and 34-36** under 35 U.S.C. 103(a) as being unpatentable over Sunder (in *Macromolecules*, 2000, 33, pp 309-314 "*Hyperbranched*") in view of Keller et al (US 6143850) and Tournilhac et al (US 6287552) is incorporated herein by reference.

"*Hyperbranched*" fails to teach a hyperbranched polymer which would meet the formula of instant claim 32.

"*Copolymers*" teaches that ring opening multibranching polymerization of glycidol produces hyperbranched polyether polyols with narrow polydispersities (p 7682, right col, top). "*Copolymers*" further teaches lowering the degree of branching in a predicatble manner by copolymerizing the glycidol ABm type monomers with linear AB monomers (p 7682, right column). This allows tailoring of material properties such as molecular architecture, functionality, and thermal behavior (p 7683, top left). In addition, branching ABm type monomers are generally expensive compared to linear AB monomers (p 7686 top left). Incorporation of linear polymers represents a cost-savings strategy.

It would have been obvious, therefore, to one of ordinary skill in the art at the time the invention was made, to copolymerize the glycidol taught by "*Hyperbranched*" with a linear comonomer, as taught by "*Copolymers*," in order to tailor the material properties of the polymer in a predictable manner, as well as to decrease costs by using less expensive monomers.

Response to Arguments

Applicant's arguments with respect to claims 25-36 filed 6/2/09 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to RACHEL KAHN whose telephone number is (571)270-7346. The examiner can normally be reached on Monday to Friday 8:00 am to 5:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on 571-272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/R. K./
Examiner, Art Unit 1796

/Randy Gulakowski/
Supervisory Patent Examiner, Art Unit 1796